

What is claimed is:

1. An electroporation plate, comprising:
  - a. a plurality of energizable electroporation wells arrayed in a solid substrate, wherein each electroporation well comprises at least two electroporation electrodes disposed therein, and wherein the at least two electroporation electrodes in at least two of the wells can be independently energized; and
  - b. electrical connections for connecting the electroporation electrodes to an energy source.
- 10 2. An electroporation plate according to claim 1 that comprises about 2, 12, 24, 96, 192, 288, 384, 576, 768, 672, 1536, 3072, or 6144 electroporation wells.
- 15 3. An electroporation plate according to claim 1 wherein the electroporation wells are of substantially uniform dimensions.
4. An electroporation plate according to claim 1 wherein the electroporation wells are substantially either cylindrical or rectangular.
- 20 5. An electroporation plate according to claim 1 wherein each electroporation well has a volume between about 1 uL and about 10 mL.
6. An electroporation plate according to claim 1 wherein the electroporation wells have a volume of about 1 uL to about 1 mL.
- 25 7. An electroporation plate according to claim 1 wherein the electroporation wells have a volume of about 1 mL to about 10 mL.
8. An electroporation plate according to claim 1 wherein one of the electroporation electrodes in an electroporation well is disposed opposite of the other electroporation electrode.

9. An electroporation plate according to claim 1 wherein each electroporation well comprises at least one sidewall and a bottom wall.

5 10. An electroporation plate according to claim 9 wherein the electroporation electrodes of an electroporation well are integrated into the sidewall.

11. An electroporation plate according to claim 1 wherein the electroporation wells arranged in a plurality of rows and columns.

10 12. An electroporation plate according to claim 11 wherein the electroporation electrodes in the electroporation wells of a row are operably connected so as to be simultaneously energized.

15 13. An electroporation plate according to claim 12 wherein the operably connected electroporation electrodes in the electroporation wells of one row can be energized independently of the electroporation electrodes in electroporation wells in other rows of the electroporation plate.

20 14. An electroporation plate according to claim 13 wherein the electroporation electrodes in each row are energized independently of the electroporation electrodes in other rows of the electroporation plate.

25 15. An electroporation plate according to claim 1 wherein the electrodes in each well comprise a plurality of electrodes that are each individually energizable.

16. An electroporation plate according to claim 15 wherein said plurality of electrodes comprises between 2 and 12 pairs of electrodes.

30 17. An electroporation plate according to claim 16 wherein the electrodes of each pair of electrodes comprise a cathode and an anode positioned in said well opposite to one another.

18. An electroporation plate according to claim 17 wherein at least two adjacent pairs of electrodes are energized simultaneously as an electrode set.
19. An electroporation plate according to claim 1 wherein the electroporation electrodes in each electroporation well are independently energizable.  
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20. An electroporation plate according to claim 1 wherein the material comprising the solid substrate is selected from the group consisting of plastic, metal, and ceramic.
- 10 21. An electroporation plate according to claim 1 wherein the solid substrate is transparent.
22. An electroporation plate according to claim 1 wherein the solid substrate is translucent.
- 15 23. An electroporation plate according to claim 1 wherein the solid substrate is opaque.
24. An electroporation plate according to claim 1 wherein the electroporation electrodes are integrated in the solid substrate.
25. An electroporation plate according to claim 1 wherein the electroporation electrodes are deposited on a surface of the solid substrate.  
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26. An electroporation plate according to claim 1 wherein the electroporation electrodes are deposited by vapor deposition.
- 25 27. An electroporation plate according to claim 26 wherein the electroporation electrodes comprise an electrically conductive material or a combination of electrically conductive materials.
28. An electroporation plate according to claim 26 wherein the electrical connection  
30 comprises pins and sockets.

29. An electroporation plate according to claim 26 wherein the electrical connection comprises an independent electrical contact for each pair of electroporation electrodes that is independently energized.

5 30. An electroporation system, comprising:

- a. an electroporation plate according to claim 1; and
- b. a power supply adapted for connection to the electrical connector of the electroporation plate.

10 31. An electroporation system according to claim 30 further comprising a plate handler configured to hold the electroporation plate during operation of the electroporation system.

32. An electroporation system according to claim 30 further comprising a plate reader.

15 33. An electroporation system according to claim 32 wherein the plate reader uses a reading element selected from the group consisting of a machine vision device, a spectrophotometer, and a luminomitor to collect electroporation data by examining the contents of one or more of the electroporation wells of the electroporation plate.

20 34. An electroporation system according to claim 32 wherein the plate reader is integrated into the plate handler.

35. An electroporation system according to claim 30 wherein the plate handler is a robotic plate handler.

25 36. An electroporation system according to claim 35 further comprising a plate storage facility for storing electroporation plates during the course or following completion of an electroporation experiment.

30 37. An electroporation system according to claim 36 wherein the plate storage facility is an incubator configured to hold a plurality of electroporation plates.

38. An electroporation system according to claim 33 further comprising a data storage device to store data collected by the plate reader.

5 39. An electroporation system according to claim 38 further comprising an optimization computer adapted to optimize electroporation conditions from electroporation data stored in the memory.

10 40. A method of introducing an exogenous molecule into a host cell, comprising using electroporation to introduce the exogenous molecule into the host cell in a suspension contained in an electroporation well of an electroporation plate according to claim 1.

41. A method according to claim 40 wherein the exogenous molecule is a nucleic acid.

15 42. A method according to claim 40 wherein the host cell is selected from the group consisting of eukaryotic cell and a prokaryotic cell.

43. A method according to claim 42 wherein the host cell is a eukaryotic cell selected from the group consisting of an animal cell and a plant cell.

20 44. A method according to claim 43 wherein the eukaryotic cell is an animal cell selected from the group consisting of a mammalian cell, an insect cell, a fish cell, a bird cell, an arachnid cell, a mollusk cell, and a crustacean cell.

25 45. A method according to claim 44 wherein the eukaryotic cell is a mammalian cell from a mammal selected from the group consisting of bovine, canine, equine, feline, murine, ovine, and porcine animals.

30 46. A method according to claim 43 wherein the eukaryotic cell is a cell from a mammalian cell line.

47. A method according to claim 43 wherein the eukaryotic cell is a plant cell from a monocotyledonous plant or a dicotyledonous plant.